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# **China Energy Data 2020**

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**Edited by  
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## **Introduction**

Energy Data 2020 was authored by Mr. Wang Qingyi, one of China's leading energy experts, with financial support from Energy Foundation China and research and editing assistance from innovative Green Development Program (iGDP). The Energy Data publication series (annual editions from 2014 to the present year) collates and organizes data across key sectors published by China's official statistics bureaus and industry associations, as well as authoritative international energy agencies. The goal is to facilitate access by researchers and policymakers to comprehensive, multi-dimensional, and long time-scale energy data that accurately captures China's energy profile. The English version of the 2020 Energy Data report contains 39 data energy indicator tables covering China's energy economy, energy production and consumption, energy efficiency and technology, energy prices, and energy-related pollutant emissions and carbon emissions.

## Abbreviations

BERC	Building Energy Conservation Research Center of Tsinghua University
CAREI	China Association of Rural Energy Industry
CBMF	China Building Materials Industry Association
CCIA	China Coal Industry Association
CEC	China Electricity Council
CERS	China Energy Research Society
CISA	China Iron and Steel Industry Association
CNPC	China National Petroleum Corporation
CPCIF	China Petroleum and Chemical Industry Federation
CPEA	China Petroleum Enterprise Association
CSES	China Solar Energy Society
CWEA	China Wind Energy Association
GACC	General Administration of Customs
IEA	International Energy Agency
IEEJ	Institute of Energy Economics, Japan
IMF	International Monetary Fund
MEE	Ministry of Ecology and Environment
MIIT	Ministry of Industry and Information Technology
MNR	Ministry of Natural Resources and Forestry
MOA	Ministry of Agriculture and Rural Affairs
MOT	Ministry of Transport
MOHURD	Ministry of Housing and Urban-Rural Development
MWR	Ministry of Water Resources
NBS	National Bureau of Statistics
NDRC	National Development and Reform Commission
NEA	National Energy Administration
OICA	International Organization of Motor Vehicle Manufacturers
PBS	Provincial Bureau of Statistics
SERC	State Electricity Regulatory Commission
WB	World Bank
WSA	World Steel Association

# Table of Contents

<b>Table of Contents .....</b>	<b>1</b>
TABLE 1 KEY ENERGY AND ECONOMIC INDICATORS .....	1
TABLE 2 INTERNATIONAL COMPARISONS OF KEY ENERGY AND ECONOMIC INDICATORS PER CAPITA .....	2
TABLE 3 ECONOMIC AND ENERGY CONSUMPTION DISPARITY BETWEEN REGIONS, URBAN AND RURAL AREAS, AND THE RICH AND POOR .....	3
TABLE 4 INTERNATIONAL COMPARISON OF LIVING STANDARDS OF CHINA'S MOST AFFLUENT CITIES .....	4
TABLE 5 URBAN AND RURAL LIVING STANDARDS AND ENERGY CONSUMPTION .....	5
TABLE 6 STATUS OF ELECTRIFICATION AND POVERTY IN RURAL CHINA.....	6
TABLE 7 COAL, OIL, AND NATURAL GAS RESOURCES AND RESERVES.....	6
TABLE 8 ENERGY PRODUCTION BY SOURCE .....	7
TABLE 9 TOP 10 OIL FIELDS FOR CRUDE OIL PRODUCTION.....	8
TABLE 10 CRUDE OIL REFINING VOLUME AND MAIN PRODUCTS OUTPUT .....	8
TABLE 11 TOP 10 LARGEST COAL COMPANIES .....	9
TABLE 12 INSTALLED ELECTRICITY CAPACITY AND ELECTRICITY GENERATION .....	9
TABLE 13 TOP 5 BIGGEST POWER GENERATION GROUPS.....	10
TABLE 14 KEY INDICATORS FOR THE POWER INDUSTRY .....	10
TABLE 15 DEVELOPMENT AND UTILIZATION AMOUNT OF RENEWABLE ENERGY .....	11
TABLE 16 RENEWABLE ENERGY USE IN CONSTRUCTION .....	12
TABLE 17 PRIMARY ENERGY CONSUMPTION AND STRUCTURE.....	13
TABLE 18 FINAL ENERGY CONSUMPTION AND STRUCTURE BY SECTOR .....	14
TABLE 19 OIL PRODUCTS CONSUMPTION BY SOURCE .....	14
TABLE 20 NATURAL GAS CONSUMPTION AND STRUCTURE .....	14
TABLE 21 ELECTRICITY CONSUMPTION PER CAPITA .....	15
TABLE 22 ENERGY CONSUMPTION OF THE MANUFACTURING INDUSTRY.....	16
TABLE 23 ENERGY CONSUMPTION OF TRANSPORT.....	17
TABLE 24 AGRICULTURAL AND RURAL ENERGY INDICATORS .....	17
TABLE 25 ELECTRICITY CONSUMPTION OF HOUSEHOLD ELECTRIC APPLIANCES .....	18
TABLE 26 ENERGY SAVING .....	18
TABLE 27 ENERGY SAVING IN THE MANUFACTURING INDUSTRY.....	19
TABLE 28 ENERGY SAVING IN TRANSPORTATION .....	20
TABLE 29 ENERGY SAVING IN CONSTRUCTION.....	20
TABLE 30 PHYSICAL ENERGY EFFICIENCY .....	21
TABLE 31 ENERGY CONSUMPTION OF ENERGY INTENSIVE PRODUCTS.....	21
TABLE 32 INDUSTRIAL SECTOR CAPACITY ELIMINATION.....	23
TABLE 33 ENERGY IMPORT AND EXPORT .....	24
TABLE 34 ENERGY PRICES.....	24
TABLE 35 R&D EXPENDITURE FOR COMPANIES IN THE ENERGY AND ENERGY-INTENSIVE INDUSTRY.....	25
TABLE 36 CLEAN COAL TECHNOLOGY AND COAL CHEMICAL INDUSTRY .....	26
TABLE 37 COMPARISON OF MAIN INDICATORS OF COAL INDUSTRY BETWEEN CHINA AND THE US.....	27
TABLE 38 EMISSIONS OF MAJOR POLLUTANTS.....	28
TABLE 39 CO2 EMISSIONS IN CHINA AND THE WORLD .....	29

Table 1

## Key Energy and Economic Indicators

	1949	1978	2000	2010	2015	2016	2017	2018	2019
Population (10,000)	54167	96529	126743	133920	137462	138271	139008	139538	140005
Proportion of city and town population (%)	10.6	17.9	36.2	49.7	56.1	57.4	58.5	59.6	60.6
GDP growth rate (%)		11.7	8.4	10.6	6.9	6.7	6.9	6.6	6.1
GDP (100 million Chinese yuan)	466	3650	99215	413030	689052	744127	827122	900309	990865
Economic structure									
Primary industry (%)	68	27.9	15.1	10.1	9	8.6	7.9	7.2	7.1
Secondary industry (%)	13	47.9	45.9	46.7	40.5	39.8	40.5	40.6	39.0
Tertiary industry (%)	19	24.2	39	43.2	50.5	51.6	51.6	52.2	53.9
GDP per capita (USD)	23	149	949	4556	8007 s	8127	8836	9750	10276
Primary energy consumption (Mtce)	26	571.4	1469.6	3606.5	4299.1	4358.2	4490	4640	4860
Crude oil import dependency/%		-12.4	26.4	54.5	60.7	65.5	68.6	70.9	72.5
Urban resident disposable income per capita (Chinese yuan)	100	343	6280	19109	31195	33616	36396	39251	42359
Rural resident net income per capita (Chinese yuan)	44	134	2253	5919	11422	12363	13432	14617	16021
Civil vehicle ownership (10,000 vehicle)	5.1	135.8	1608.9	7801.8	16284.5	18574.5	20906.7	24028	26150
Energy consumption per capita (kgce)	48	594	1160	2693	3128	3152	3230	3325	3471
Electricity per capita (kWh)	8	218	1063	2752	4142	4312	4538	4905	5157
Electricity production (TWh)	41.3	256.6	1355.6	4207.1	5814.6	6133.2	6495.1	7111.8	7503.4
Steel output (Mt)	0.16	31.8	128.5	637.2	803.8	808.4	831.7	928	996.3
Cement output (Mt)	0.66	65.2	597	1881.9	2359	2414	2340	2208	2350
Total amount of export goods (USD 100 million)	5.5	97.5	2492	15777.5	22739.7	20976.3	22635.2	24809.9	24982.5
Total amount of import goods (USD 100 million)	5.8	108.9	2250.9	3962.4	16795.6	15879.3	18409.8	21288.4	20752.6
PM2.5 ( $\mu\text{g}/\text{m}^3$ )			22	35	52	47	43	39	36
SO <sub>2</sub> emissions (Mt)			19.95	21.85	18.59	17.55	16.15	15.07	14.41
Chinese yuan/USD exchange rate		1.5300	8.2785	6.7695	6.2284	6.6423	6.7518	6.6174	6.8985

Notes: 1. The urbanization rate of household registered population in 2019 was 46.3%.

2. GDP is calculated at current prices and the growth rate is calculated at constant prices. 2018's GDP at constant prices was 11814600 million Chinese yuan.

3. In 2018, nationwide per capita income at constant price increased 59.2 times compared to that of 1949.

Sources: NBS; GACC; CEC; MEE.

**Table 2 International Comparisons of Key Energy and Economic Indicators Per Capita (2019)**

	China	US	EU	Japan	Russia	India	World
Population (millions)	1400.0	328.8	515.0	126.2	146.7	1366.4	7579.0
GDP per capita (USD)	10276	65111	35748	40844	11162	2171	11355
Fossil fuel recoverable reserves per capita							
Coal (t)	193	759	148	3	1622	80	145
Oil (t)	2.57	23.08	1.17	0.05	100.20	0.21	32.30
Natural gas (m <sup>3</sup> )	6000	39234	1974	164	262857	971	26230
Primary energy consumption per capita (kgce)	3384	9819	5312	5049	6933	851	2629
Electricity production per capita (kWh)	5360	13386	7192	8212	7622	1141	3563
Steel output per capita (kg)	172	304	352	787	488	81	247
Vehicle ownership per thousand people	173	837	531	591	373	32	170
CO <sub>2</sub> emissions per capita (t)	6.35	15.19	7.44	11.64	10.44	1.83	4.51

Note: China's fossil fuel recoverable reserves data are from the Ministry of Natural Resources.

Sources: NBS; IEA; WB; IMF; BP Statistical Review of World Energy, June 2020; IEEJ, Handbook of Energy and Economic Statistics in Japan, 2016 version; WSA; OICA.

**Table 3 Economic and Energy Consumption Disparity between Regions, Urban and Rural Areas, and the Rich and Poor**

Economy	
GDP per capita (USD) (2019)	National average: 10276 Max: Beijing 23804 Min: Gansu 4784
Urban residents' disposable income per capita/Chinese yuan (2019)	National average: 42359 Max: Shanghai 73615 Min: Jilin 32299
Rural residents' disposable income per capita/Chinese yuan (2019)	National average: 16621 Max: Shanghai 33195 Min: Gansu 9629
Energy Consumption	
Regional	
Energy consumption per capita/kgce (2019)	National average: 3471 Max: Ningxia 10056 Min: Tibet 1383**
Electricity consumption per capita/kWh (2019)	National average: 5157 Max: Ningxia 15602 Min: Tibet 2047
Residential electricity consumption per capita/kWh (2019)	National average: 734 Max: Beijing 1168 Min: Tibet 306*
Urban and rural	
Energy consumption per capita/kgce (2019)	National average: 3471 Urban: 4642 Rural: 1580
Electricity consumption per capita/kWh (2019)	National average: 5157 Suzhou: 14367 Rural: 1719
Residential electricity consumption per capita/kWh (2019)	National average: 734 Urban: Shenzhen 1128* Rural: Gansu 264*
Rich and Poor	
Rich and poor disparity	In 2018, 1% of China's highest-income families possessed 1/3 of the nation's wealth, and 1/4 of the lowest-income families owned only 1% of the nation's wealth.
Urban residents' disposable income per capita/yuan (2019)	20% high-income households: 91683 20% low-income households: 15549
Rural residents' disposable income per capita/yuan (2019)	20% high-income households: 36049 20% low-income households: 4263
Home computer ownership/100 households (2019)	National average: 53.2 Urban: 72.2 Rural: 27.5 Max: Shanghai 112.5 Min: Tibetan rural areas 4.6
Air conditioner ownership/100 households (2019)	National average: 115.6 Urban: 148.3 Rural: 71.3 Max: Jiangsu 226.3 Min: Tibetan 0.6
Private car ownership/100 households (2019)	National average: 35.3 Urban: 43.2 Rural: 24.7 Max: Henan 100 Min: Hainan rural areas 10.3

Note: 1.\*2016;\*\*2017.

Sources: NBS; PBS; China Social Science Survey Center of Peking University; CEC; China's Report on the Development of the People's Livelihood 2018.



**Table 4 International Comparison of Living Standards of China's Most Affluent Cities (2019)**

	Beijing	Shanghai	Shenzhen	Ordos	Shenmu	Tokyo (Japan)
Total population (10,000)	2154	2428	1344	209	49	1350
Urbanization Rate	86.6	88.1	100.0	75.1	70.3	
GDP per capita (USD)	23803	22802	29498	25088	40617	73185
Disposable income per capita (USD)	9826	10671	9073	25150	24862	31001
Housing area per capita (m <sup>2</sup> )	39	41	40	42	38	35
Private cars (per 100 households)	54	39	75	96	90	46

Note: Private car data refer only to urban households. data for Tokyo is from 2016.

Source: NBS; City Statistics Bureaus; Statistics Bureau of Japan.

**Table 5 Urban and Rural Living Standards and Energy Consumption**

	2000	2010	2015	2016	2017	2018	2019
Per capita GDP (USD)	949	4556	8007	8127	8836	9750	10276
Urban residents' disposable income per capita (Chinese yuan)	6280	19109	31195	33616	36396	39251	42359
Rural residents' net income per capita (Chinese yuan)	2253	5919	11422	12363	13432	14617	16021
Engel's coefficient, urban households (%)	39.40	35.70	29.70	29.30	28.60	27.70	27.6
Engel's coefficient, rural households (%)	49.10	41.10	33.00	32.20	31.20	30.10	30.0
Housing area per capita (m <sup>2</sup> )							
Urban (building area)	20.30	31.60	33.50	37.00	40.00	39.00	39.8
Rural (living area)	24.90	27.30	31.20	32.00	33.60	47.30	48.9
Penetration rate of energy-consuming appliances (per 100 households)							
Indoor air conditioners							
Urban	30.80	112.10	114.60	123.70	128.60	142.20	148.3
Rural	1.30	16.00	38.80	47.60	52.80	55.20	71.3
Refrigerators							
Urban	80.10	96.60	94.00	96.40	98.00	100.90	102.5
Rural	12.30	45.20	82.60	89.50	91.70	95.90	98.6
Color TVs							
Urban	116.60	137.40	122.30	122.30	123.80	121.30	122.8
Rural	48.70	111.80	116.90	118.80	120.80	116.60	117.6
Home computers							
Urban	9.70	71.20	78.50	80.00	80.80	73.10	72.2
Rural	0.50	10.40	25.70	27.90	29.20	26.90	27.5
Private cars							
Urban	0.50	13.10	30.00	35.50	37.50	41.00	43.2
Rural	—	—	13.3	17.4	19.3	22.3	24.7
Energy consumption per capita (kgce)	1160	2693	3128	3153	3230	3325	3471
Electricity consumption per capita (kWh)							
Urban	2574	4519	6212	6370	6587	7108	7399
Rural	205	989	1496	1566	1652	1659	1719

Sources: NBS; CEC.

**Table 6****Status of Electrification and Poverty in Rural China**

	1978	2000	2010	2015	2016	2017	2018	2019
Rural population/million	790.14	808.37	674.15	603.46	589.73	576.61	564.01	551.62
Poverty standard/Chinese yuan /per capita	100	625	2300	2855	3100	3300	3535	3747
Population poverty/million	250	32.1	26.9	55.8	43.4	30.46	16.60	5.51
Population without access to electricity/million	450.0	35.0	5.3	0	0	0	0	0
Electricity consumption per capita/kWh	218	205	989	1496	1566	1652	1659	1719

Note: 1. The poverty standard for 2020 is calculated using constant prices based on the 2010 poverty standard of 2300 Chinese yuan. It is 4000 yuan in 2020.

2. According to the World Bank poverty level (i.e., living on less than 1 USD a day per capita), there were 212 million people in China living below the poverty line in 2018.

3. In 2015, electricity was provided to the remaining 39800 persons without access to electricity.

4. On November 23, 2020, last nine impoverished counties (Guizhou) achieved poverty alleviation in China.  
Sources: NBS; CEC; NEA; SERC.

**Table 7****Coal, Oil, and Natural Gas Resources and Reserves****Coal**

The estimated total amount of coal resources is 3879.6 billion t. At the end of 2019, the proven reserves were 1.77 trillion t, and the remaining technically recoverable reserves were 270.4 billion t.

**Petroleum**

Crude oil: the amount of geological resources is 125.7 billion t, and the recoverable resources are 30.1 billion t. The remaining technically recoverable reserves are 3.6 billion t in 2019 .

Oil sand: the amount of geological resources is 6 billion t, and the amount of recoverable resources are 2.3 billion t.

Oil shale: the technically recoverable resources are 243.2 billion t, and the amount of shale oil that can be recovered is 12 billion t.

**Natural gas**

Conventional natural gas: the amount of the geological resources is 90 trillion m<sup>3</sup>, the volume of the recoverable resources is 50 trillion m<sup>3</sup> .in 2019, the total proven geological reserves were 16.84 trillion m<sup>3</sup>, and the remaining technically recoverable reserves were 8.4 trillion m<sup>3</sup>.

Coal bed gas: the amount of geological resources is 30 trillion m<sup>3</sup>, and the recoverable resources are 12.5 trillion m<sup>3</sup>. In 2018, the accumulated geological reserves were 605.9 billion m<sup>3</sup>, and the remaining technically recoverable reserves were 313.5 billion m<sup>3</sup>.

Shale gas: the amount of geological resources is 122 trillion m<sup>3</sup>, and the recoverable resources are 22 trillion m<sup>3</sup>. In 2018, the proven geological reserves were 1041.5 billion m<sup>3</sup>, and the technically recoverable reserves were 225.3 billion m<sup>3</sup>.

Source: MNR.

Table 8

## Energy Production by Source

Year	Raw coal (Mt)	Crude oil (Mt)	Natural gas (100 million m <sup>3</sup> )	Electricity production (TWh)	Share of electricity production from hydropower (TWh)
1990	1080	138.30	153.0	621.20	126.70
1991	1087	141.00	160.7	677.50	124.70
1992	1116	142.10	157.9	753.90	130.70
1993	1150	145.20	167.7	839.50	151.80
1994	1240	146.10	175.6	928.10	167.40
1995	1361	150.10	179.5	1007.00	190.60
1996	1397	157.30	201.1	1081.30	188.00
1997	1388	160.70	227.0	1135.60	196.00
1998	1332	161.00	232.8	1167.00	198.90
1999	1364	160.00	252.0	1239.30	196.60
2000	1384	163.00	272.0	1355.60	222.40
2001	1472	164.00	303.3	1480.80	277.40
2002	1550	167.00	326.6	1654.00	288.00
2003	1835	169.60	350.2	1910.60	283.70
2004	2123	175.87	414.6	2203.30	353.50
2005	2365	181.35	493.2	2500.30	397.00
2006	2570	184.77	585.5	2865.70	435.80
2007	2760	186.32	692.4	3281.60	485.30
2008	2903	190.43	803.0	3495.76	637.00
2009	3115	189.49	852.7	3714.65	615.60
2010	3428	202.41	957.9	4207.16	722.17
2011	3764	202.88	1053.4	4713.02	698.95
2012	3945	207.48	1106.1	4987.60	872.10
2013	3974	209.92	1208.6	5431.64	920.29
2014	3874	211.43	1301.6	5794.46	1072.88
2015	3747	214.36	1346.1	5810.58	1126.42
2016	3411	199.69	1368.7	6142.49	1193.37
2017	3524	191.51	1480.3	6495.14	1189.84
2018	3683	189.11	1602.7	7111.77	1234.23
2019	3850	191.01	1761.7	7503.43	1304.44

Source: NBS.

**Table 9**      **Top 10 Oil Fields for Crude Oil Production (crude oil/10000 t)**

	2018	2019
1. PetroChina Changqing Oilfield	5641	5700
2. PetroChina Daqing Oilfield	4167	4363
3. CNOOC Bohai Oilfield	3000	3000
4. PetroChina Tarim Oilfield	2673	2850
5. Sinopec Shengli Oilfield	2383	2400
6. PetroChina southwest oil and gas field	1812	2139
7. PetroChina Xinjiang oil field	1379	1480
8. Yanchang oil group	1310	1120
9. CNOOC Nanhai Oilfield	1305	1000
10. PetroChina Liaohe Oilfield	1040	1000

Source: CPEA.

**Table 10**      **Crude Oil Refining Volume and Main Products Output**      **Unit: Mt**

	2000	2010	2015	2016	2017	2018	2019
Crude refining volume	210.80	426.80	522.00	541.00	567.77	603.57	651.98
Production of main products							
Total of Gasoline, kerosene and diesel	120.83	252.09	335.17	347.80	328.62	324.34	360.17
Gasoline	41.32	76.76	119.99	129.00	121.03	138.88	141.21
Kerosene	8.78	17.08	35.19	39.80	30.01	47.70	52.58
Diesel	70.73	158.25	179.99	179.00	177.58	137.76	166.38
Fuel oil	20.54	25.37	23.84	25.87	26.93	20.24	24.70

Sources: NBS; CPCIF.

**Table 11****Top 10 Largest Coal Companies****Unit: Mt**

	2015	2016	2017	2018	2019
1. National Energy Group	495.9	506.0	510.0	508.0	510
2. China Coal Energy Group	159.4	146.0	163.7	192.2	210
3. Shanxi Coal and Chemical Industry Group	127.0	106.3	137.1	160.2	176
4. Yankuang Group	108.0	114.0	130.0	161.5	166
5. Datong Coal Mine Group	173.5	117.9	126.2	137.2	149
6. Shandong Energy Group	133.0	120.2	141.3	145.4	125
7. Shanxi Coking Coal Group	105.3	91.2	96.1	100.1	104
8. Jizhong Energy Group	101.0	81.4	79.3	81.0	88
9. Jinneng Group	70.4	71.4	80.2	84.5	82
10. Yang Quan Coal Group	76.2	79.0	81.9	82.0	75

Source: CCIA.

**Table 12****Installed Electricity Capacity and Electricity Generation**

	1990	2000	2010	2015	2016	2017	2018	2019
Installed electricity capacity by year-end/GW	137.89	319.32	966.41	1508.28	1645.75	1777.03	1899.67	2010.66
Hydropower	36.05	79.35	216.06	319.37	332.11	341.19	352.26	356.40
Thermal power	101.84	237.54	709.67	990.21	1053.88	1106.04	1143.67	1190.55
Nuclear power	—	2.10	10.82	26.08	33.64	35.82	44.66	48.74
Wind power		0.35	44.7	145.4	168.7	188.3	209.4	210.1
Electricity generation/TWh	621.32	1386.5	4207.2	5814.57	6133.16	6495.14	7111.77	7503.43
Hydropower	126.35	243.1	722.2	1130.27	1184.05	1189.84	1232.90	1304.44
Thermal power	494.97	1107.9	3331.9	4284.19	4437.07	4662.74	4923.10	5220.15
Nuclear power	—	16.7	73.9	170.79	213.29	248.07	294.40	348.35
Wind power			72.2	251.2	294.4	305.7	366.0	405.3

Note: In 2019, the share of coal power in the total electricity generation was 62.2%.

Sources: NBS; CEC.

**Table 13****Top 5 Biggest Power Generation Groups (2019)**

	National Energy Group	Huaneng Group	Datang Group	Huadian Group	China Power Investment Corp
Installed capacity (GW)	246.44	182.00	144.00	153.00	151.00
Clean energy ratio (%)	50.5	34.0	35.6	40.4	48.9
Power generation (TWh)	969.0	713.6	545.4	578.6	553.8
Net coal consumption (gce/kWh)	304.8	298.7	301.8	289.3	299.8

Note: The National Energy Group was founded by the reconstruction of China Guodian Corporation and China Shenhua Group on Nov. 28<sup>th</sup>, 2017.

Source: CEC.

**Table 14****Key Indicators for the Power Industry**

	2000	2005	2010	2015	2016	2017	2018	2019
Net coal consumption rate (gce/kWh)	392	370	333	315	312	309	308	306
Gross coal consumption rate (gce/kWh)	363	343	312	297	294	292	290	289
Power consumption rate of thermal power plants (%)	7.31	6.80	6.33	6.04	6.01	6.04	5.95	6.03
Line loss rate (%)	7.70	7.21	6.53	6.64	6.49	6.48	6.27	5.93
Utilization hours for power generating equipment	4517	5425	4650	3988	3779	3786	3879	3825
Hydropower	3258	3664	3404	3590	3619	3579	3607	3726
Thermal power	4848	5865	5031	4364	4186	4209	4378	4293

Source: CEC.

**Table 15 Development and Utilization Amount of Renewable Energy**

		2000	2005	2010	2015	2016	2017	2018	2019
Hydropower	GW	79.4	117.4	213.4	319.4	332.1	341.2	352.0	356.4
	TWh	243.1	397.0	722.2	1126.4	1193.4	1194.5	1232.9	1304.4
	Mtce	88.2	136.2	225.3	335.6	352.1	348.8	357.5	377.0
Of which: small-scale hydropower									
	GW	24.8	38.5	59.0	75.0	77.9	79.3	80.4	81.4
	TWh	80.0	120.9	202.3	240.0	268.2	247.7	234.6	253.3
	Mtce	29.0	41.5	63.1	71.5	79.1	72.3	68.0	73.2
Solar energy	Mtce	3.1	9.6	22.6	64.6	75.1	85.5	109.3	121.4
Photovoltaic power generation	10,000 kW	1.8	7.0	122.0	4318.0	7742.0	13025.0	17445.0	20430.0
	100M kWh	0.19	0.74	12.9	392.0	662.0	967.0	1775.0	2243.0
	Mtce	0.01	0.03	0.40	11.64	19.53	28.2	51.5	64.8
Water heaters	10,000 m <sup>2</sup>	2600	8000	18500	44200	46400	47780	48200	47240
	Mtce	3.1	9.6	22.2	53.0	55.6	57.3	57.8	56.6
Wind power generation	GW	0.34	1.22	44.78	145.4	150.0	163.7	184.3	210.1
	TWh	0.5	2.0	72.2	251.2	259.0	297.0	334.3	357.7
	Mtce	0.2	0.7	22.5	74.6	74.9	85.8	96.6	103.4
Rural biogas	100M m <sup>3</sup>	23	86	145	168	174	184	188	198
	Mtce	1.6	6.1	10.4	12.0	12.1	13.1	13.4	14.1
Biomass and waste power generation	GW	0.8	2.0	6.7	16.0	12.3	14.8	17.8	23.7
	TWh	3.5	8.7	29.0	68.9	66.1	79.5	90.6	111.1
	Mtce	1.3	3.0	9.0	20.4	19.3	23.2	26.4	32.1
Geothermal utilization	Mtce	0.7	1.2	6.7	24.1	31.1	37.0	44.2	63.8
	Total	86.3	197.8	284.3	491.1	568.6	593.5	625.9	711.8

Note: 1. Small-scale hydropower refers to stations with an installed capacity of less than 50MW.

2. In 2018, photovoltaic utilization hours amounted to 1113h and wind power utilization hours were 2013h.

3. The energy provided by solar water heaters was 120kgce/m<sup>2</sup>/a.

4. For geothermal energy, in every heating season, ground source heat pumps generated 25 kgce/m<sup>2</sup> of energy, and geothermal space heating generated 28 kgce/m<sup>2</sup>.

5. Renewable energy power generation was converted to standard coal equivalent using coal consumed in thermal power generation for the same year, the gross coal consumption rate (gce/kWh) in 2000, 2005, 2010, 2015, 2016, 2017, 2018 and 2019 was 363, 343, 312, 297, 294, 292, 290 and 289 respectively.

Sources: NBS; China Energy Statistical Yearbook 2019; NDRC; NEA; MWR; MOA; MOHURD; MNR; CEC; CSES; CAREI; China Resource Comprehensive Utilization Association; CWEA; National Geothermal Energy Center; BERC.



Table 16

## Renewable Energy Use in Construction

	2015		2017		2018		2019	
	Physical quantity	Standard quantity /Mtce	Physical quantity	Standard quantity /Mtce	Physical quantity	Standard quantity /Mtce	Physical quantity	Standard quantity /Mtce
Solar water heaters	442 Mm <sup>2</sup>	53.0	478 M m <sup>2</sup>	57.3	482 Mm <sup>2</sup>	57.8	472 Mm <sup>2</sup>	56.6
Photovoltaic power generation	687 GWh	0.2	3363 GWh	0.9	5643 GWh	1.5	7550 GWh	2.2
Ground source heat pumps	410 Mm <sup>2</sup>	10.3	618 Mm <sup>2</sup>	15.5	793 Mm <sup>2</sup>	19.9	872 Mm <sup>2</sup>	21.9
Geothermal space heating	494 M m <sup>2</sup>	13.8	77 Mm <sup>2</sup>	21.5	87 Mm <sup>2</sup>	24.3	150 Mm <sup>2</sup>	41.9
Rural biogas	16.8 BN m <sup>3</sup>	12.0	18.4 BN m <sup>3</sup>	13.1	18.8 BN m <sup>3</sup>	13.4	19.8 BN m <sup>3</sup>	14.1
Total		89.3		108.3		116.9		56.6

Note: 1. Solar water heaters provided 120kgce/m<sup>2</sup>/a of energy, geothermal heating, 28kgce/m<sup>2</sup>/heating season, and ground source heat pumps 25kgce/m<sup>2</sup>/heating season.

2. Power generation was converted into coal equivalent according to the gross coal consumption rate of thermal power generation.

Sources: NBS; NDRC; NEA; Department of Education, Science & Technology, MOA; BERC; MOHURD; Solar Thermal Utilization Specialty Committee of CAREI; Energy Saving Stove Professional Committee of CAREI; CSES; MNR; Geothermal Specialty Committee, CERS; National Geothermal Energy Center.

Table 17

## Primary Energy Consumption and Structure

Year	Total energy consumption (10,000 tce)	Share (total energy consumption =100)			
		Coal	Oil	Natural gas	Hydro, nuclear and wind power
1978	57144	70.7	22.7	3.2	3.4
1980	60275	72.2	20.7	3.1	4.0
1985	76682	75.8	17.1	2.2	4.9
1990	98703	76.2	16.6	2.1	5.1
1991	103783	76.1	17.1	2.0	4.8
1992	109170	75.7	17.5	1.9	4.9
1993	115993	74.7	18.2	1.9	5.2
1994	122737	75.0	17.4	1.9	5.7
1995	131176	74.6	17.5	1.8	6.1
1996	135192	73.5	18.7	1.8	6.0
1997	135909	71.4	20.4	1.8	6.4
1998	136184	70.9	20.8	1.8	6.5
1999	140569	70.6	21.5	2.0	5.9
2000	146946	68.5	22.0	2.2	7.3
2001	155547	68.0	21.2	2.4	8.4
2002	169577	68.5	21.0	2.3	8.2
2003	197083	70.2	20.1	2.3	7.4
2004	230281	70.2	19.9	2.3	7.6
2005	261369	72.4	17.8	2.4	7.4
2006	286467	72.4	17.5	2.7	7.4
2007	311442	72.5	17.0	3.0	7.5
2008	320611	71.5	16.7	3.4	8.4
2009	336126	71.6	16.4	3.5	8.5
2010	360648	69.2	17.4	4.0	9.4
2011	387043	70.2	16.8	4.6	8.4
2012	402138	68.5	17.0	4.8	9.7
2013	416913	67.4	17.1	5.3	10.2
2014	425806	65.6	17.4	5.7	11.3
2015	429905	63.7	18.3	5.9	12.1
2016	435819	62.0	18.5	6.2	13.3
2017	449000	60.4	18.8	7.2	13.6
2018	464000	59.0	18.9	7.8	14.3
2019	486000	57.7	19.6	8.3	14.4

Source: NBS.

**Table 18****Final Energy Consumption and Structure by Sector**

	2010		2015		2016		2017		2018	
	Mtce	%	Mtce	%	Mtce	Mtce	Mtce	%	Mtce	%
Agriculture	78.7	3.3	98.4	3.3	96.8	3.1	95.0	3.0	93.2	2.9
Industry	1610.9	67.5	1803.3	60.3	1814.6	58.8	1810.1	57.7	1805.5	56.3
Transportation	330.2	13.8	448.4	15.0	503.5	16.3	532.9	17.0	576.2	18.0
Buildings	368.0	15.4	638.2	21.4	672.9	21.8	700.2	22.3	730.6	22.8
Total	2387.8	100	2988.3	100	3087.8	100	3138.2	100	3205.5	100.0

**Table 19****Oil Products Consumption by Source****Unit: Mt**

	2000	2005	2010	2015	2016	2017	2018	2019
Gasoline	35.05	48.53	68.56	115.99	119.83	122.20	127.70	131.73
Diesel	67.74	109.73	146.99	174.07	164.69	166.70	173.53	166.38
Kerosene	8.70	10.77	17.65	27.90	30.23	33.45	37.42	38.70
Fuel oil	38.73	42.42	37.58	29.20	29.03	29.40	24.56	24.15

Sources: NBS; CPCIF; CNPC Economics &amp; Technology Research Institute.

**Table 20****Natural Gas Consumption and Structure**

	2010		2015		2016		2017		2018		2019	
	100 million m <sup>3</sup>	%	100 million m <sup>3</sup>	%	100 million m <sup>3</sup>	%	100 million m <sup>3</sup>	%	100 million m <sup>3</sup>	%	100 million m <sup>3</sup>	%
Power generation	192.4	17.9	395.0	20.5	446.0	21.4	21.4	19.5	485.0	17.3	552	18.0
Chemicals	187.3	17.4	245.0	12.7	254.0	12.2	273.0	11.4	286.0	10.2	307	10.0
Industry	381.3	35.4	454.0	23.5	493.0	23.6	727.0	30.4	1022.0	36.5	1073	35.0
Transportation	79.7	7.4	243.0	12.6	261.0	12.5	272.0	11.3	300.0	10.7	381	12.4
Buildings	235.1	21.9	594.0	30.7	631.0	30.3	655.0	27.4	710.0	25.3	754	24.6
Total	1075.8	100.0	1931.0	100.0	2085.0	100.0	2394.0	100.0	2803.0	100.0	3067	100.0

Sources: NBS; NEA; CNPC Economics &amp; Technology Research Institute; Gas-consuming Industries.

**Table 21      Electricity Consumption Per Capita****Unit: kWh**

	National	Urban	Rural
1978	218	1072	32
1995	535	1747	100
2000	1063	2574	205
2005	1624	2999	587
2010	2752	4519	989
2015	4142	6212	1496
2016	4321	6370	1566
2017	4538	6578	1652
2018	4905	7108	1659
2019	5157	7399	1719

Sources: NBS.

Table 22

## Energy Consumption of the Manufacturing Industry (2019)

	energy consumption per unit of product	2019 production	2019 energy consumption (Mtce)
Steel	850 kgce/t	996.3Mt	846.9
Electrolytic aluminum	13257kWh/t	35.0 Mt	143.8
Copper smelting	335kgce/t	9.78 Mt	3.4
Cement	131 kgce/t	2350 Mt	307.9
Building ceramics	6.6 kgce/m <sup>2</sup>	10.16 billion m <sup>2</sup>	67.1
Wall materials	421 kgce/10,000 block standard bricks	13565 TN standard bricks	55.4
Sheet glass	12.5 kgce/ weight case	926 million weight cases	11.6
Building Lime	141 kgce/t	125 Mt	17.6
Oil refining	92 kgce/t	634 Mt (process load)	58.3
Ethylene	800 kgce/t	20.52 Mt	16.4
Synthetic ammonia	1418 kgce/t	57.58 Mt	81.6
Caustic soda	861 kgce/t	34.64 Mt	29.8
Sodium carbonate	328 kgce/t	26.20 Mt	8.6
Calcium carbide	3141 kWh/t	25.82 Mt	23.3
Paper and paperboard	312 kgce/t	107.7 Mt	33.6
Total			1705.3
			2436.1

Note: 1. The comprehensive energy consumption of products is industrywide. Wall materials' energy consumption is a weighted average of clay solid bricks and new wall materials.

2. Product power consumption is converted into coal equivalent according to the gross coal consumption rate.

3. The energy consumption of the 15 products of six industries shown in the above table accounts for about 70% of the energy consumption of the manufacturing industry.

Sources: NBS; NDRC; MIIT; China Iron and Steel Association; China Nonferrous Metals Industry Association; CEC; CBMF; China Petroleum and Chemical Industry Federation; China Chemical Energy Conservation Technology Association; China Ceramics Industry Association; China Carbide Industry Association; China Paper Making Association.

**Table 23****Energy Consumption of Transport**

	2005	2010	2014	2015	2016	2017	2018	2019
Highways								
Gasoline (Mt)	46.08	67.5	101.7	112.0	118.0	120.4	122.9	128.6
Diesel (Mt)	54.60	77.9	108.0	105.3	90.2	108.6	107.6	111.7
Railways								
Diesel (Mt)	5.61	6.72	6.58	6.25	7.03	8.28	8.16	8.22
Electricity (100 million kWh)	198.1	307.0	478.0	507.7	571.2	595.0	603.0	607.0
Waterways								
Diesel and Fuel oil (Mt)	14.83	22.45	27.49	26.19	27.50	27.8	27.3	28.7
Civil aviation								
Kerosene (Mt)	9.52	16.01	23.4	25.6	30.3	33.45	37.41	36.84

Sources: NBS; NDRC; National Railway Administration; State Railway Administration; MOT; The National Civil Aviation Authority; Chinese Automotive Technology Research Center; CNPC Economics & Technology Research Institute.

**Table 24****Agricultural and Rural Energy Indicators**

	2000	2010	2015	2017	2018	2019
Total power of agricultural machinery (10,000 kW)	52574	92786	111728	98783	100372	102758
Effective irrigation area (10,000 ha)	5382.0	6034.8	6587.3	6781.6	6827.2	6867.9
Water-saving irrigation area (10,000 ha)	1639	2731	3106	3432	3614	3706
Chemical fertilizers application (10,000 t)	4145	5562	6023	5859	5653	5404
Installed capacity of small rural hydropower plants (10,000 kW)	698.5	5924.0	7588.0	7927.0	8044.0	8144.0
Rural electricity consumption (100 million kWh)	2421.3	6632.3	9026.9	9524.4	9358.5	9482.9

Source: NBS.

**Table 25 Electricity Consumption of Household Electric Appliances (2019)**

	Ownership (100 million)		Electricity consumption (100 million kWh)	
	Households	Whole society	Households	Whole society
Air conditioners	4.86	7.47	2624	4085
Refrigerators	4.24	4.29	1238	1252
Color TVs	5.07	5.64	639	709
Rice cookers	3.56	3.56	347	347
Electric fans	6.10	8.70	120	171
Electric shower water heaters	2.03	2.26	964	1074
Kitchen ventilators	2.49	2.76	301	335
Microwave ovens	1.69	1.88	76	85
Washing machines	4.03	4.47	161	180
Total			6470	8238

Note: 1. The ownership rate of households was calculated by multiplying the national average per 100 households by 420.5 million households.

2. The ratio of ownership of households to ownership of whole society: electric cooker, 100%; room air conditioner, 65%; electric fan, 70%; and all the other appliances, 90%.

3. The average power and annual utilization hours per appliance: room air conditioner 1200W, 450h; color TV 120W, 1050h; electric cooker, 650W, 150h; electric fan 55W, 360h; electric shower water heater 2500W, 190h; lampblack machine 220W, 550h; microwave oven 750W 60h; washing machine 400W, 100h; refrigerators had an average daily power consumption of 0.8kWh.

Sources: NBS; Average power and annual utilization hours of household appliances compiled by Wang Qingyi, Energy Data in 2014.

**Table 26 Energy Saving (2019)****Unit: Mtee**

	Energy saving in 2019 compared with 2018	Share %
Technical energy saving	83.64	67.6
Manufacturing Industry	39.33	31.7
Transportation	17.53	14.2
Construction	26.78	21.6
Structural energy saving	40.16	32.4
Total energy saving	123.8	100.0

Table 27

Energy Saving in the Manufacturing Industry (2019)

	Product energy consumption					Production in 2019	Energy saving in 2019 compared with 2018 (Mtce)
	Unit	2010	2015	2017	2018	2019	
Steel	kgce/t	950	899	890	861	850	996.3 Mt
Electrolytic aluminum	kWh/t	13979	13562	13577	13555	13257	35.0 Mt
Copper	kgce/t	500	372	359	342	335	9.78 Mt
Cement	kgce/t	143	137	133	132	131	2350 Mt
Building ceramics	kgce/m <sup>2</sup>	7.7	7.0	6.8	6.7	6.6	10.16 billion m <sup>2</sup>
Wall materials	kgce/10,000 standard bricks	468	444	429	425	421	1316 billion standard bricks
Building Lime	kgce/t	160	145	143	142	141	125 Mt
Sheet glass	kgce/weight case	16.9	14.7	14.3	14.0	12.5	9.27 million weight cases
Oil refining	kgce/t	100	96	97	96	92	1128Mt (processing amount)
Ethylene	kgce/t	950	854	841	840	800	20.52 Mt
Synthetic ammonia	kgce/t	1587	1495	1463	1453	1418	57.60 Mt
Caustic soda	kgce/t	1006	897	875	871	861	34.64 Mt
Sodium Carbonate	kgce/t	385	339	333	331	328	26.20 Mt
Calcium carbide	kWh/t	3340	3303	3279	3208	3141	25.82 Mt
Paper and paperboard	kgce/t	390	339	326	318	312	107.7 Mt
Total							27.53
Total of manufacturing industry							39.33

Note: 1. In the product energy consumption column, electricity consumption was converted into standard coal equivalent by coal consumption in power generation.

2. Each product's energy consumption is the average of the whole industry.

3. In this table, the 16 products listed came from six industries whose energy consumption accounted for 70% of the aggregate consumption in manufacturing.

Sources: NBS; 2020 China Statistical Abstract; NDRC; MIIT; CEC; CISA; China Nonferrous Metals Industry Association; CBMF; China Cement Association; China Ceramics Industrial Association; China Petroleum and Chemical Industry Federation; China Chemical Energy Conservation Technology Association; China Soda Industry Association; China Carbide Industry Association; China Paper-making Association.



**Table 28**                      **Energy Saving in Transportation (2018)**

	Unit workload energy consumption (kgce/10,000 conversion t-km)				Workload in 2019 (100 million converted t-km)	Energy-saving amount (10,000 tce) in 2019 compared with 2018
	2015	2017	2018	2019		
Highways	506.5	486.0	480.0	474.0	72466	1594
Railways	47.1	43.3	41.1	39.4	31546	54
Waterways	41.3	40.2	40.1	39.2	104043	84
Civil aviation	5152	4562	4223	4203	1206	21
Total						1753

Sources: NBS; State Railway Administration; MOT; CEC; China Association of Automobile Manufacturers; China Automotive Technology Research Center; CNPC Economics & Technology Research Institute; Statistical Bulletin of Transportation Industry Development in 2019; Statistical Bulletin of China Civil Aviation in 2019; 2019 Railway Statistics Bulletin.

**Table 29**                      **Energy Saving in Construction (2019)**                      Unit: Mtce

	2015	2016	2017	2018	2019
New buildings	10.20	15.67	16.00	18.30	22.90
Existing residential buildings	1.67	1.32	1.60	2.38	3.88
Total	11.87	16.99	17.60	20.68	26.78

Note: 1. The indicator of new buildings in 2019 refers to the energy-saving capacity of the newly built buildings that adopted energy-saving building codes (amount to a total of 2.47 billion m<sup>2</sup>).

2. The indicator of existing residential buildings in 2019 refers to the energy-saving capacity of buildings, which was achieved through improvements by energy-saving technology in the north (260million m<sup>2</sup>).

3. Energy-saving from lighting was achieved by the replacement of incandescent lamps with LED lighting.

4. Renewable energy applications include solar water heaters, photovoltaic power generation, ground source heat pumps, geothermal heating, and biogas in rural areas.

Sources: MOHURD; NRDC; MNR; MOA; China Association of Rural Energy Industry; China Association of Solar Energy; National Semiconductor Lighting Industry Development and Industry Alliance.

**Table 30****Physical Energy Efficiency****Unit: %**

	2000	2005	2010	2014	2015	2016	2017	2018
1. Mining efficiency	33.0	33.3	35.9	36.2	36.2	36.3	36.6	36.6
2. Intermediate efficiency	68.5	70.8	70.9	68.7	67.5	68.7	70.0	70.8
3. End-use efficiency								
Agriculture	32.0	33.0	34.0	36.2	36.5	36.6	36.7	36.8
Industry	46.0	47.3	50.5	53.8	54.0	54.8	55.0	55.2
Transportation	28.9	29.2	29.1	33.1	33.3	34.5	34.5	34.7
Residential and commercial	66.0	68.4	74.2	74.2	74.5	74.8	75.4	76.2
Total	46.7	48.3	51.0	53.5	54.8	55.2	55.4	55.6
4. Energy efficiency (2×3)	32.0	34.2	36.0	36.8	37.0	37.9	38.8	39.4
5. Overall efficiency of energy system (1×4)	10.6	11.4	12.9	13.3	13.4	14.1	14.2	14.4

Notes: 1. This table was calculated according to internationally accepted definitions of energy balance and calculation methods.

2. Intermediate refers to energy processing, conversion, storage, and transportation.

**Table 31****Energy Consumption of Energy Intensive Products**

	2000	2010	2015	2016	2017	2018	2019	International advanced level
Gross heat consumption of thermal power generation (gce/kWh)	363	312	298	294	292	290	289	287
Net heat consumption of thermal power plants (gce/kWh)	392	333	315	312	309	308	306	275
Full energy consumption for steel (kgce/t)								
Whole industry	1475	950	899	898	890	861	850	
Large and medium-sized enterprises	906	701	663	676	670	634		
Comparable energy consumption for steel (kgce/t)	784	681	644	640	634	613	605	576
AC power consumption for electrolytic aluminum (kWh/t)	15418	13979	13562	13599	13577	13555	13257	12900
Full energy consumption for copper smelting (kgce/t)	1227	500	372	366	359	342	335	360
Full energy consumption for cement (kgce/t)	172	143	137	135	133	132	131	97
Full energy consumption for wall materials (kgce/10,000 standard bricks)	763	468	444	434	429	425	421	300
Full energy consumption for building ceramics (kgce/m <sup>2</sup> )	8.6	7.7	7.0	6.9	6.8	6.7	6.6	3.4
Full energy consumption for building lime /kgce/t		160	145	144	143	142	14.1	120

Full energy consumption for sheet glass (kgce/weight case)	25.0	16.9	14.7	14.4	14.2	14.0	12.5	13.0
Full energy consumption for crude oil processing (kgce/t)	118	100	96	97	97	97	92	73
Full energy consumption for ethylene (kgce/t)	1125	950	854	842	841	841	800	629
Full energy consumption for synthetic ammonia (kgce/t)	1699	1587	1495	1486	1463	1453	1418	990
Full energy consumption for caustic soda (kgce/t)	1439	1006	897	878	875	871	861	670
Full energy consumption for sodium carbonate (kgce/t)	406	385	329	336	333	331	328	255
Electricity consumption for calcium carbide (kWh/t)	3475	3340	3303	3224	3279	3208	3141	3000
Full energy consumption for paper and paperboard (kgce/t)								
Whole industry	912	390	339	333	326	318	312	
Home made pulp and paper enterprises	1540	1200	1045	1027	1006	981	962	506

Note:

1. The international advanced level is an average of the leading nations.
2. For full energy consumption in China and overseas for all years, electricity consumption was converted to coal equivalent by gross coal consumption.
3. The gross heat consumption rate and net heat consumption rate in China were calculated from generators above 6MW; the international advanced level is Japan, and net heat consumption is Italy. In 2017, in China, coal made up 95.3% of all thermal power stations, oil 0.2%; and gas 4.5%. In Japan those ratios were 45.6%, 7.3%, and 47.1%. In Italy, those were 21.0%, 6.2%, 72.8%.
4. The full energy consumption for steel in China is from large and medium-sized enterprises, whose production accounted for 75.7% of the whole country in 2018. The international advanced level was from Germany.
5. The full energy consumption for cement is split into the heat consumption of clinker and full electricity consumption for cement. Electricity consumption was calculated as standard coal equivalent. Here, the international advanced level was from Germany. In 2014, the substitution rate of alternative fuel (petrol coke, waste plastics, waste tire, city garbage, and so on) was 63.4%.
6. The international leading level of full energy consumption for wall materials was the US.
7. Most ethylene in China is manufactured from naphtha. In the Middle East, classified as an international advanced leading country here, ethylene is manufactured from ethane.
8. The international advanced level of caustic soda is a German and Italian joint venture called Thyssenkrupp Industrial Solutions AGCorp.
9. Full energy consumption for synthetic ammonia was calculated from the average value of large-, medium-, and small-sized enterprises with coal, oil, and gas as raw materials. In 2018, 75% of China's synthetic ammonia production was from coal. The international advanced level was from the US, which uses natural gas for 98% of ammonia production.

Sources: NBS; MIIT; China Coal Industry Association; CEC; CISA; China Nonferrous Metals Industry Association; CBMF; Sinopec and Chemical Industry Federation; China Ceramics Industrial Association; China Paper Association; China Chemical Fibers Association; Institute of Energy Economics, Japan, Handbook of Energy and Economic Statistics, 2016 version; The Germany Iron and Steel Enterprises Association; The Germany Cement Engineering Association.

**Table 32****Industrial Sector Capacity Elimination**

	Production capacity elimination						2019 Production
	2006~ 2010	2015	2016	2017	2018	2019	
Coal/Mt	450.0	90	290	150	150	110	3580
Charcoal/Mt	10.38	19.35	40	16.8	19.2	29	471.3
Thermal power/GW	72.1	4.23	4	5.0	12.9	20.0	1190.6
Steel/Mt	68.6	17.1	65	50	30		996.3
Electrolytic aluminum/Mt	0.80	0.34	0.88	2.4	2.72		35.0
Cement/Mt	403	39	0.11	50	84		2350
Sheet glass/ million weight cases	152	11	33	230	120		927
Calcium carbide/Mt	4.0	2.0	2.52	3.5	3.7	1.3	25.82
Paper and paperboard/Mt	10.3	5.90	10.0	3.0	1.6		107.7

Sources: NBS; MIIT; CEC; CISA; CBMF; China Cement Association; China Ceramics Industrial Association; CPCIF; China Chemical Energy Conservation Technology Association; China Paper-making Association.

**Table 33****Energy Import and Export**

	2000	2005	2010	2014	2015	2016	2017	2018	2019
Crude oil (Mt)									
Exports	10.44	8.07	3.04	0.60	2.87	2.94	4.86	2.63	0.88
Imports	70.27	127.08	239.31	308.36	335.49	381.04	419.97	461.90	505.72
Petroleum products (Mt)									
Exports	10.30	16.88	30.44	33.84	40.92	53.07	52.16	58.64	66.85
Imports	24.32	41.45	47.84	46.55	52.63	53.27	60.56	60.19	54.95
Natural gas (100 million m <sup>3</sup> )									
Exports	31.40	29.70	40.30	25.70	32.00	33.30	34.80	34.00	34.8
Imports			164.70	583.50	603.20	736.20	943.60	1250.00	1323.0
Coal (Mt)									
Exports	58.84	71.68	19.03	5.74	5.33	8.78	8.17	4.93	6.03
Imports	2.02	26.17	164.78	291.22	204.06	255.51	270.90	281.23	299.70

Note: 1. Coal imports include brown coal imports, which was 102.59 million t in 2019.

2. China imported 137.6 Mt coal from Indonesia, 76.96 Mt from Australia, 36.21 Mt from Mongolia, 32.24 Mt from Russia, 9.34 Mt from Philippines. Total imports from the above five countries add up to 97.5% of total coal imports in 2019.

3. China imported 132.3 billion m<sup>3</sup> natural gas, including 50.7 billion m<sup>3</sup> pipeline gas and 81.6 billion m<sup>3</sup> LNG.

4. China imported 47.9 billion m<sup>3</sup> pipeline gas from Central Asia, which takes up 94.5% of China's total pipeline natural gas import in 2019. China imported 39.58 billion m<sup>3</sup> LNG from Australia and 11.8 billion m<sup>3</sup> from Qatar.

Source: GACC.

**Table 34****Energy Prices**

		2017	2018	2019
Steam coal for power generation	Yuan/t	536	528.6	556
No.92 gasoline retail price	Yuan/litre	6.37	6.42	6.78
Civil natural gas	Yuan/m <sup>3</sup>	1.34	1.62	1.80
Electricity for residents	Yuan/MWh	0.53	0.56	0.57

Note: 1. Steam coal prices are prices for June.

Sources: National Development and Reform Commission.

**Table 35 R&D Expenditure for Companies in the Energy and Energy-Intensive Industry****Unit: 100 million Chinese yuan**

	2010	2015	2016	2017	2018	2019
Industry total	4015.4	10013.9	10944.7	12013.0	12459.8	13971.1
Coal mining and washing	108.7	143.3	132.1	148.9	146.5	109.2
Petroleum and natural gas exploitation	88.1	62.5	63.9	57.3	89.3	93.8
Petroleum processing, coking and nuclear fuel processing	43.8	100.8	119.6	146.6	145.4	184.7
Production and supply of electric power and heating	31.9	81.4	81.6	85.8	96.9	113.0
Steel	402.1	561.2	537.7	638.7	706.9	686.3
Non-ferrous metals	118.9	371.5	406.8	461.6	442.5	479.8
Building materials	81.3	277.6	323.1	362.8	415.9	520.1
Chemical industry	247.5	794.4	840.7	912.5	899.9	923.4
Chemical fibers	41.0	78.5	83.8	106.1	112.1	123.7
Food, beverages and tobacco	98.8	246.2	274.8	267.7	298.4	294.2
Textile and apparel	101.2	297.8	236.9	343.7	358.4	371.5
Paper and paper products	36.7	107.6	122.8	144.6	167.8	152.7
Transportation equipment	582.2	1340.1	1348.3	1593.4	1712.9	1718.7
Electrical machinery and apparatus	425.1	1012.7	1102.4	1242.4	1320.1	1406.2
Communications equipment, computers and other electronic equipment manufacture	686.3	1611.7	1811.0	2002.8	2279.9	2448.1
General and special machinery manufacture	472.2	1199.7	1242.8	1333.7	1461.4	1599.6

Note: 2010 data was from large and medium-sized enterprises; 2011-2019 data was from enterprises above the designated size.

Source: NBS.

**Table 36****Clean Coal Technology and Coal Chemical Industry (2019)**

Coal preparation	Raw coal preparation rate in 2019 was 73.2% and 2820 Mt raw coal was washed and 300Mt of coal was saved, saving the equivalent of 214 Mtce. Saved coal was more than 10%.
Briquette	Industrial briquette saved 15% coal and civil briquette saved 25% coal. In 2019, 47Mt of coal was saved (34Mtce) .
Coal water slurry	Capacity in 2019 was 230Mt. Industrial boilers comprised 30Mt, with an energy saving rate of 20% and coal saving of 4Mt; 200Mt gasification was used in the kiln, with an energy saving rate of 15%, and coal saving of 67Mt. Total coal saved was 71Mt.
Industrial Boiler	Coal-fired industrial boilers saved 79.2Mtce in 2019. Coal was saved by: 1. Substitution of natural gas and biomass; 2. Combined heat and power, centralized heating of regional boiler rooms; 3. Improved boiler technology; 4. Coal washing and improved coal quality.
Ultra Critical Coal Power	In 2019, 111 million-kilowatt generating units were in operation, coal consumption for the power supply was 24gce/kWh less than the industry average, and coal was saved by 11.4Mtce.
Circulating fluidized bed boiler	In 2019, capacity was 130GW. Compared with conventional boilers, 10% of coal and 13.0Mtce were saved.
Coal gangue electricity generation	In 2019, the installed capacity was 74GW, generating 3430kWh, and saving 98.8Mtce of coal. In 2019, clean coal technology saved 501.4Mtce of coal and reduced CO <sub>2</sub> by 1358.8Mt.

Sources: China Coal Processing & Utilization Association; Coal Industry Clean Coal Engineering Technology Research Center; CEC; CPCIF.

**Table 37 Comparison of Main Indicators of Coal Industry between China and the US (2018)**

	China	US
Raw coal production (Mt)	3683	797
Coal exports (Mt)	4.93	109.4
Coal imports (Mt)	281.23	5.44
Coal consumption (Mt)	3839	624.1
Percentage of coal used in power generation (%)	49.1	92.6
Percentage of production in surface mines (%)	16.3	65.0
Average mining exploitation depth (m)	510	90
Average coal price on mine (USD/t)	66.1	38.5
Coal mines in operation	5800	978
Coal industry employees (10,000 people)	350	7.4
Raw coal production efficiency (ton per capita each year)	1052	10784
Coal miners average wage (USD/year)	11088	84080
Death number of mine accidents	333	15*
Death rate of mine accidents (person/Mt)	0.090	0.019*

Note: 1. Commodity coal takes up 86% of raw coal in the U.S.

2. \* for 2017.

Source: NBS; China Coal Industry Association; DOE/EIA; National Mining Association.



**Table 38****Emissions of Major Pollutants**

Year	PM2.5 (ug/m <sup>3</sup> )	SO <sub>2</sub> (Mt)	NOx (Mt)	Chemical oxygen demand (COD) (Mt)
2000	22	19.95		14.45
2001		19.48		14.05
2002		19.27		13.67
2003		21.59		13.34
2004		22.55		13.39
2005		25.49		14.14
2006	28	25.89	15.24	14.28
2007		24.68	16.40	13.82
2008		23.21	16.25	13.21
2009		22.14	16.93	12.78
2010		21.85	18.52	12.38
2011		22.18	24.04	25.00
2012		21.18	23.38	24.24
2013	72	20.44	22.27	23.53
2014	61	19.74	20.78	22.95
2015	50	18.59	18.51	22.24
2016	47	17.55	17.77	21.66
2017	43	16.15	16.90	20.99
2018	39	15.07	16.07	20.17
2019	36	14.41	15.51	19.62

Note: From the beginning of 2011, the COD statistics collection method has changed, thus post-2011 data cannot be directly compared with data collected before 2011.

Source: MEE.

Table 39

CO<sub>2</sub> Emissions in China and the World

	Total emissions /Mt-CO <sub>2</sub>						2019 Emissions per capita /t- CO <sub>2</sub>
	2010	2015	2016	2017	2018	2019	
China	7530 (8138)	8674 (9534)	8661 (9485)	8737 (9667)	8920 (9869)	8890 (9826)	6.35
United States	5486	5741	5042	5088	5117	4965	15.19
India	1662	2149	2243	2344	2481	2480	1.83
Russia	1492	1491	1511	1525	1551	1533	10.44
Japan	1202	1210	1193	1177	1150	1123	8.83
Germany	783	754	771	764	717	681	8.30
South Korea	591	624	630	680	662	639	12.46
Iran	518	570	599	634	644	671	8.18
Saudi Arabia	486	587	600	595	571	580	17.29
Canada	530	546	543	560	566	556	13.36
EU	3923	3488	3499	3542	3440	330	7.44
World	13066	32787	32936	33444	34008	34169	4.51

Note: China's emissions were calculated by fossil fuel consumption and its CO<sub>2</sub> emissions factors. CO<sub>2</sub> emissions related to coal consumption are based on commercial coal metrology, the number in the parentheses () represents CO<sub>2</sub> emissions based on raw coal. Commercial coal refers to coal on sale after the process of washing. In 2019, the washing rate of raw coal in China was 73.2%, the share of the removal of waste rock in washed raw rock was 18%. CO<sub>2</sub> emissions calculated by BP in 2010, 2015, 2016, 2017, 2018 and 2019 were 8143 Mt, 9186 Mt, 9138 Mt, 9298 Mt, 9507 Mt and 9826 Mt respectively.

Sources: BP Statistical Review of World Energy, June 2020.